Remarks/Arguments:

Preliminary Matters

Claims 1-27 were originally filed in the above identified application. Claims 16-27 are withdrawn. Thus, claims 1-15 are the pending claims in the above identified application.

35 U.S.C. § 102

Claims 1-2, 5, 8-12, and 15 were rejected under 35 U.S.C. § 102(b) as being unpatentable in view of Chen et al. Applicants traverse the rejection of these claims, and respectfully submit that the claims are patentable over Chen et al. for the following reasons.

Chen et al. concerns view interpolation of texture maps and their shapes, by computing intermediate frames from an array of pre-stored, static images. Chen et al. disclose that adjacent images are morphed to create a new image for an in-between viewpoint. This is accomplished by the use of offset vectors that track pixel movement as an image is warped from one image to another (page 281, first column, lines 14-19). This feature is fundamentally different from the Applicants' invention because Chen et al. warp one camera image to a second image by generating a first warp map. The second image is then warped to the first image by generating a second warp map. These warp maps are combined and a virtual image is generated by linearly interpolating the offset vectors of the combined warp map (page 281, first column, lines 45-48).

The Applicants, however, disclose taking two camera images, warping each image to the virtual viewpoint separately, and then merging the two warped images to create a virtual image. Thus, the Applicants' invention merges two warped images while Chen et al. merges two warp maps. Chen et al. further differs from the Applicant's invention because Chen et al. does not disclose or suggest warping images to the virtual viewpoint, but rather warping the pre-stored static image to one another, and linearly interpolating the pixel offset vector between the two images to generate an in-between virtual image. Therefore, Chen et al. neither disclose nor suggest the limitations of claim 1, including:

> c) determining at least two sets of warp parameters using the at least two depth maps corresponding to said at least two images, <u>each set of warp parameters corresponding to warping one of the at least two images *to the virtual viewpoint*</u>;

d) warping the at least two images to generate at least two warped images *representing the virtual viewpoint* using the at least two sets of warp parameters corresponding to said at least two images; and

e) merging the at least two warped images to create the high quality virtual image.

Because Chen et al. do not disclose or suggest the features of claim 1, set forth above, claim 1 is patentable over Chen et al. Independent claims 3 and 12, while not identical to claim 1, include features similar to claim 1. Claims 2, 4-11 includes all the features of claim 1 from which they depend; claims 13-15 include all the features of claim 12 from which they depend. Therefore, claims 2, 4-11, and 13-15 should also be allowed at least as dependent upon their respective allowable base claims. Thus, for the reasons set forth above, claims 1-15 are patentable over Chen et al. Withdrawal of the rejection under 35 U.S.C. 102(b) is respectfully requested.

35 U.S.C. § 103

Claims 3-4, 6-7, and 13-14 were rejected under 35 U.S.C. § 103(a) as being unpatentable in view of Chen et al. and at least one of Faugeras et al., Trucco et al., Rogina et al, Luo et al., and Saito et al. Applicants traverse the rejection of these claims and respectfully submit that the claims are patentable over the cited references for the following reasons.

Chen et al. is described above. Faugeras et al. disclose a method to reconstruct a three dimensional model of a static environment viewed by several cameras (page 3, paragraph 1). Faugeras et al. disclose that their method may track feature points between frames to establish correspondences between images from the different cameras (page 8, paragraph 4). In fact, Faugeras et al. describe a feature conceptually similar to Chen et al. (i.e. offset vectors) because Faugeras describes that tracking a point of interest (i.e. a pixel) is performed by predicting its shift in position from one image to another by searching within a narrow range for that actual point. This is accomplished by Faugeras using fundamental matrices of epipolar geometry to determine correspondences between pairs of images. Faugeras et al., however, do not disclose or suggest merging warped images to form a virtual image.

Because neither Chen et al. nor Faugeras et al. disclose or suggest the features of claim 3, set forth above, *prima facie* obviousness has not been established based on the cited

references. Thus, for the reasons set forth, claim 3 is not subject to rejection under 35 U.S.C. § 103(a) in view of Chen et al. and Faugeras et al. Withdrawal of the rejection under 35 U.S.C 103(a) is respectfully requested.

Trucco et al. describe techniques for 3D reconstruction using correlation based methods and feature based methods. Trucco et al. further disclose principles of 3D reconstruction based on epipolar geometry. Trucco et al. however, do not disclose or suggest merging warped images to form a virtual image.

Rogina et al. describe image transformation and synthesis methods using offset epipolar images. Rogina et al. disclose reconstruction methods by interpolating pixel data from adjacent images onto the pixel line of the virtual image. Rogina et al., however, neither disclose nor suggest warping at least two images to generate at least two warped images representing the virtual viewpoint, and then *merging the two warped images* to form the virtual image.

Luo et al. disclose a method of stereo vision adapted to 3D reconstruction. Luo et al. describe a surface model that corrects for erroneous disparity data. Luo et al., however, do not disclose or suggest warping at least two images to generate at least two warped images representing the virtual viewpoint, and then *merging the two warped images* to form the virtual image.

Saito et al. describe a virtual view generation method for generating images from any virtual image between two selected views. Correspondences between images are obtained by the volumetric model interpolated from the virtual view images. Saito et al., however, neither disclose nor suggest warping at least two images to generate at least two warped images representing the virtual viewpoint, and then *merging the two warped images* to form the virtual image.

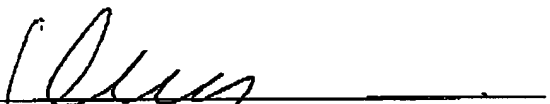
Trucco et al., Rogina et al., Luo et al., and Saito et al. neither teach nor suggest, either alone or in combination the previously described deficiencies of Chen et al. regarding independent claims 1 and 12. Claims 2, 4-11 include all the features of claim 1 from which they depend; claims 13-15 include all the features of claim 12 from which they depend. Therefore, for the reasons set forth above with regard to independent claims 1 and 12, claims 2, 4-11, and 13-15 are not subject to rejection under 35 U.S.C. §103(a) as being unpatentable

over Chen et al. in view of Trucco et al., Rogina et al., Luo et al., and Saito et al. Withdrawal of the rejection under 35 U.S.C 103(a) is respectfully requested.

In light of the foregoing amendments and remarks, Applicant respectfully requests that the Examiner reconsider and withdraw the rejection of claims 1-15.

Applicant's Attorney gratefully acknowledges the telephone interview granted by Examiners Tucker and Ometz on September 7, 2005. During this interview, the Examiners agreed with Applicant's argument that the Chen et al. reference does not disclose or suggest generating two images representing the virtual viewpoint. Accordingly, at least the rejection under 35 U.S.C. § 102(b) of claims 1, 2, 5, 8, 12 and 15 will be withdrawn.

Respectfully submitted,



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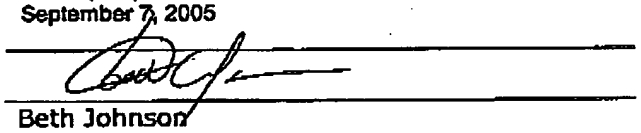

Beth Johnson

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